

9/29/59

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File

In replying please address:

A proposal has been
~~sent~~ requested from [redacted]
to replace this work order.

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September 24, 1959

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Dear Sir:

In accordance with a recent discussion with your technical representative, we are herewith submitting a proposed program of research directed toward the investigation of a method for preparing [redacted]

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[redacted] under specialized service conditions.

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Our proposal dated January 5, 1959, which led to our effort under Work Order No. VIII, Task Order No. CC, outlined the basic problems inherent in the development of a method for this purpose and also described our recommended approach to the solution of these problems. On the basis of the research performed under this Work Order, it appears that the development of a method for this application is quite feasible. Several of the candidate materials studied showed considerable promise in connection with this application, and are considered to merit additional, more detailed investigation. The results of an exploratory study of techniques for

[redacted] have also been generally favorable; it is believed that this aspect of the over-all problem would require more additional effort than the materials aspect. The technique which currently appears to be the most promising involves a small, thin-walled flexible tube, [redacted] and a

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[redacted], which would be used to inject the material, under pressure, into the small flexible tube.

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Your technical representative has suggested that we consider performing additional effort in connection with this problem. A proposed program of research directed toward achieving the above-described objective is presented in the following.

As currently contemplated, the major emphasis in the proposed program would be placed on an effort directed toward the development of a method of applying an appropriate material. This research would be concerned with a joint study of the preparation of appropriate thin flexible tubes and of the development of a suitable experimental applicator or injecting device. Thus, a further investigation would be made of techniques for preparing thin flexible tubes, free from pinholes, that would have a relatively heavy shoulder which could be butted against the front face of

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Also, further consideration would be directed toward the development of a working model of a hypodermic-syringe-type device for use in forcing material into the flexible tube, [redacted], and in maintaining pressure on the material until it hardened. Of course, such a device should be relatively small, light-weight, and inexpensive.

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There is a possibility that a metal syringe which is presently available commercially, and is used by the dental trade, could be modified for the application of interest. If this were not satisfactory, then consideration would be given to the design of a suitable experimental applicator. In this connection, one possible preliminary design which has been conceived for such a device is shown in Figure 1.

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This preliminary design incorporates two features which are considered to be particularly important; it provides for the expulsion of air as the flexible tube is loaded with the material, and also for the maintenance of pressure on the injected material until hardening occurs. As currently envisioned, this type of experimental device might operate as follows:

The material would be loaded into the chamber of the experimental applicator and then forced into the metal tube by means of the plunger. Manual pressure on the outer end of the applicator would force the O-ring against the flexible tube and the escutcheon plate, thereby sealing the experimental device [REDACTED] a spring (not shown in Figure 1) located between the outer ends of the applicator body and of the plunger might be used to permit the operator to apply sufficient force with only one hand. The material would be injected into the closed or far end of the flexible tube and would subsequently flow back, around the metal tube, [REDACTED] the flowing material would force the entrapped air ahead of it and out the exhaust port. When the flexible tube was filled, the material would begin to flow out the exhaust port. At that stage, the operator would plug the port in some manner; as a result, pressure would build up within the flexible tube, and cause it to expand and assume the contour [REDACTED] This pressure would be maintained in this manner until the material hardened.

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A suitable design for this type of experimental device should permit the unit to be dismantled for cleaning. Thus, as shown in Figure 1, provision could be made for unscrewing the front end of the unit from the body. This type of arrangement would also permit changing the size of the

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metal tube used, so that the experimental applicator could be utilized for

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It is proposed that, within the limits of the time and funds provided, the applicability of the principles underlying this type of device be investigated by means of an experimental model. If, as expected, the results of the proposed effort are favorable, then additional activity in this area of study could be provided for, probably under another contractual arrangement.

Also, additional experimentation would be performed with specific compounds and curing systems, in an effort to uncover a material that would remain fluid until forced into the flexible tube and then would harden in as short a time as possible. On the basis of the results of the previous effort, the proposed research on materials would probably be limited to considerations of (1) foam compositions, (2) epoxy resins and their modifications, and (3) polyester resins.

Toward the end of the proposed research period, the results of the effort would be discussed in detail with your technical representative, along with any pertinent recommendations in regard to additional activity directed toward the further development of an applicable method for this purpose.

During the course of the proposed research, liaison would be maintained with your technical representative by discussions during his periodic visits and via telephone. At the conclusion of the proposed research period, a summary letter report would be submitted describing the activity performed and any pertinent recommendations.

We propose to undertake this effort over a period of three months, starting on the date of acceptance of authorization from the Contracting

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Officer to proceed. The proposed investigation could be conducted under Task Order No. KK. The Work Order would be a period-basis research agreement; it could be similar in form to that used previously under Task Order No. KK and the same administrative procedure would be followed. The Work Order would require only that the proposed research be directed toward the objective outlined above, within the limits of the time and funds provided.

It is estimated that an appropriation of \$2,996, including the fixed fee, is needed to fund the proposed program for the three-month period. A general breakdown of the estimated costs is attached.

If any additional information is needed, please let us know. You may direct any inquiries of a contractual nature to at Extension 159.

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Very truly yours,

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EES:th

In Duplicate

Proposal of [redacted] to the U. S. Government.
 For Research on **A Further Study of the Development of a Specialized Method for**
 [redacted]

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Based upon a period-basis Contract for a research period of **three months.**

(Including time for submission of all reports. The proposed contract will not provide for earlier conclusion of the research.)

ESTIMATED COSTS

We expect that the cost of this research for the period indicated above may be distributed approximately as set forth hereon, subject to the understanding that this allocation is merely an estimate, and actual costs incurred may vary from the categories shown. We have determined that these estimates are reasonable and consistent with established policies in its research for the various Government agencies, which policies are briefly discussed below and will be followed in determination of our actual costs hereunder.

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Materials & Supplies, etc.

(Including any equipment which may be purchased as necessary in performance of the research. Charges of \$25 or less are excluded from this item.)

Use of Equipment and Technical Services, Travel, and Misc.

(Including applicable costs of technical research and service divisions, and use of technical equipment, except that any undistributed balances of these accounts will be included in overhead. Cost of travel includes reasonable actual subsistence expenses and the actual cost of transportation. An allowance of up to 8¢ per mile for all necessary travel by privately owned conveyance is included in lieu of the cost of such travel.)

Salaries & Wages

(Including our predetermined accrual for vacation, holiday, and sick-leave pay, pensions, and social security.)

Type of Employee	No. of Man-Months	Estimated Cost
Supervision	1/4	
Research Engineers	1-1/4	
Lab. Assistants	1/2	
Steno., Clerical, Shop & Photo., etc.	1/4	
Total Salaries & Wages		

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Overhead

59 per cent of salaries and wages, as they are defined above. Provisional monthly reimbursement will be at the rate of 59 per cent of salaries and wages, as so defined, or at such other provisional rate as may from time to time be mutually agreed upon with the Government's audit representatives. This is a provisional rate for current reimbursement, which we have arrived at by negotiation with Government representatives, and it will be subject to retroactive revision to the "actual" rate agreed upon with them for each calendar year following a detailed audit for that year. The item of overhead includes general research, charges of \$25 or less for materials and supplies, and other categories of costs we customarily include in our overhead account. Cash discounts on all purchases will be credited to overhead, instead of to the amount of the purchase. Scrap of appreciable value will be credited directly to the project. All other scrap will be credited to the overhead account, in which the Government participates.)

Total Estimated Cost

Fixed Fee

*Please let us have your acceptance in our hands by **November 9, 1959.** Contract Price
 Unless we extend the time, your acceptance after that date will be subject to agreement.

\$2,996

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